Environment CANADA Environnement
20229931 VOL 85- ISS 10 850900
EXC # 001
TD 171.5.C3 R43
REGIONAL PROGRAM REPORT (CANADA. EN
VIRONMENTAL PROTECTION SERVICE. PAC
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Environment Canada

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Environmental Protection Service

Service de la protection de l'environnement

DEPARTMENT OF THE ENVIRONMENT
ENVIRONMENTAL PROTECTION SERVICE
ENVIRONMENTAL EMERGENCIES BRANCH
PACIFIC REGION

HAZARDOUS COMMODITIES INVENTORY

HYLAND CREEK - SURREY
TILBURY INDUSTRIAL PARK - DELTA

Regional Program Report 85-10

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September 1985

1 INTRODUCTION

There is a growing awareness by municipal governments of the need for local inventories of hazardous commodities used by industries in the community. Such inventories are essential to identify the types, quantities, and location of these products and gain a better understanding of the nature, magnitude, and likelihood of potential spills. This information, when incorporated with knowledge of local physiography, can form the basis for contingency planning.

Hazardous commodities inventories will also aid various government agencies having direct or indirect environmental responsibilities. With new regulations being developed on storage, packaging, and transportation of hazardous goods, federal and provincial agencies require detailed information on present uses. Fire departments and local health officials also stand to benefit from an inventory which includes flammable and toxic substances.

The Municipalities of Richmond and Burnaby recognize the importance of local inventories. Information on hazardous goods was collected by both municipalities and efforts are now being made to program this information into a computerized data base. The Environmental Emergency Branch (EEB) of the Environmental Protection Service (EPS) acknowledges the effort made by Richmond and Burnaby officials and is attempting to expand the data base to include other lower mainland municipalities.

Two areas were selected by EEB for initial study: the Hyland Creek drainage in Surrey and the Tilbury Industrial Park in Delta. Branch personnel carried out the inventories and examined local surficial geology and drainage patterns. The information collected from industry was collated and is presented in summary form in this report. Detailed

information is contained in appendices that will be presented to the appropriate municipality. These inventories were initiated by EEB on the assumption that individual municipalities will continue with them thereby expanding the data base for the lower mainland.

2 OBJECTIVES

The objectives of a hazardous commodities inventory program are to:

1. identify the type and location of hazardous commodities in significant amounts within the municipality,

2. identify drainage areas which would be affected by a spill,

3. identify interception zones or boundaries of these drainage areas for spill containment or cleanup operations, and

4. identify the response personnel for each company in the event of a spill.

3 SURVEY METHOD

Prior to surveying the two study areas EEB personnel reviewed the inventory data sheets from Richmond and Burnaby, held discussions with Delta and Surrey representatives, and studied related EPS programs. To ensure 100% coverage of the study areas, inventory data were compiled by personal visits to individual companies. With the exception of retail paint outlets and gasoline service stations, all companies thought to use hazardous goods were contacted. Information on fuels such as diesel and propane were collected only from those companies known to have other dangerous goods in significant quantities. For the purposes of this inventory only those products assigned a United Nations four digit Product Identification Number (PIN), as listed in Canada's Emergency Response Guide for Dangerous Goods, are considered hazardous. Minimum quantities considered for each class of material are presented in Table 1.

The EEB inventory data sheets were designed to meet the information needs of the majority of emergency response departments in municipal, provincial and federal governments. A sample copy of the data sheets used in the inventory is presented in Appendix A. A general data sheet was completed for each company with additional dangerous goods being detailed on separate sheets. If a product was equally comprised of two different materials, the U.N. number and relevant information was selected for the most hazardous of the two.

TABLE 1

CLASS	DESCRIPTION	BASELINE QUANTITY
1	Explosives	no minimum
2	Gases (compressed)	45 kg or 2270 litres
3	Flammable liquids	discretionary
4	Flammable solids	discretionary
5	Oxidizing substances	45 kg or 2270 litres
6	Poisonous and infectious substances	no minimum
7	Radioactive materials	no minimum
8	Corrosives	45 kg or 2270 litres
9	Miscellaneous products	discretionary

4 STUDY AREAS AND SPILL SCENARIOS

Hyland Creek and its tributaries drain the Newton area of west central Surrey into the Serpentine River and then into Boundary Bay. The major arterial road is the King George Highway. The B.C. Hydro railway passes through the center of the basin and Highway 10 lies directly to the south.

The Hyland Creek watershed covers an area of 13.4 square kilometres of which approximately 15% is urbanized. The urban area is primarily residential with two small commercial and industrial centres. Soil types are clays and silty clays which are overlain by sand in the southeast section of the basin. Infiltration capacity of the soil is relatively low.

Hyland Creek was subjected to a spill of 40,000 l of PCP/TCP in 1984. Several thousand coho fry and adult steelhead trout were killed from the spill site in Newton through the lower reaches of the Serpentine River and in Boundary Bay. This particular drainage was selected for study because of its demonstrated sensitivity and susceptibility to a major spill.

Within the two industrial and commercial areas of Newton, 14 companies were thought likely to have hazardous goods stored on site. All companies were surveyed but only seven had such products at the time or routinely handled them. A summary of these materials is presented in Tables 2a and 2b.

The Hyland Creek scenario calls for a spill of hazardous material at XYZ Chemicals on Comber Way (Figures 1 and 1a). The flow path of the product is indicated in Figure 2. Once it enters the storm sewer system at A it cannot be controlled until in sections CD and DE. Access is

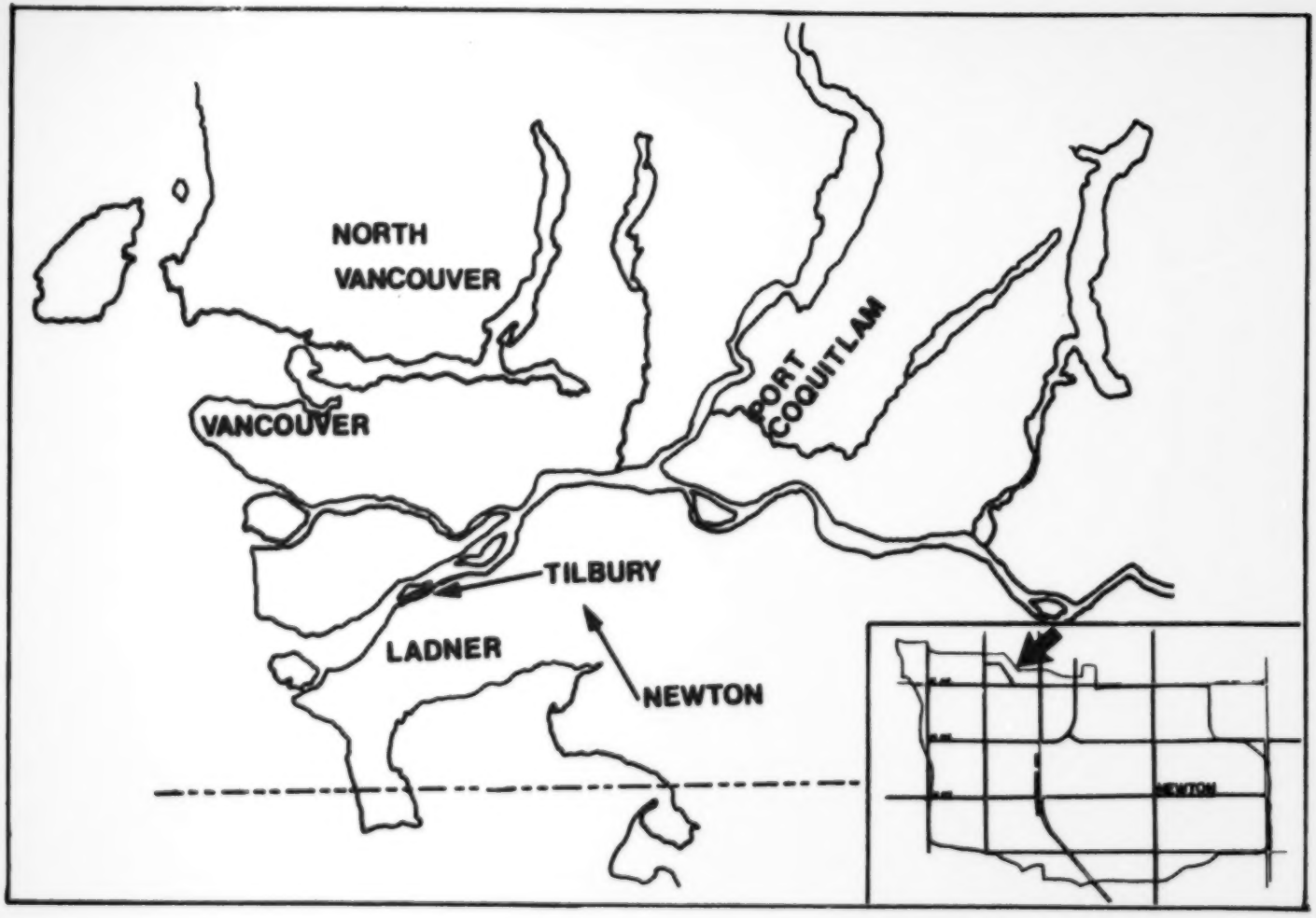


Figure 1 Hyland Creek Watershed

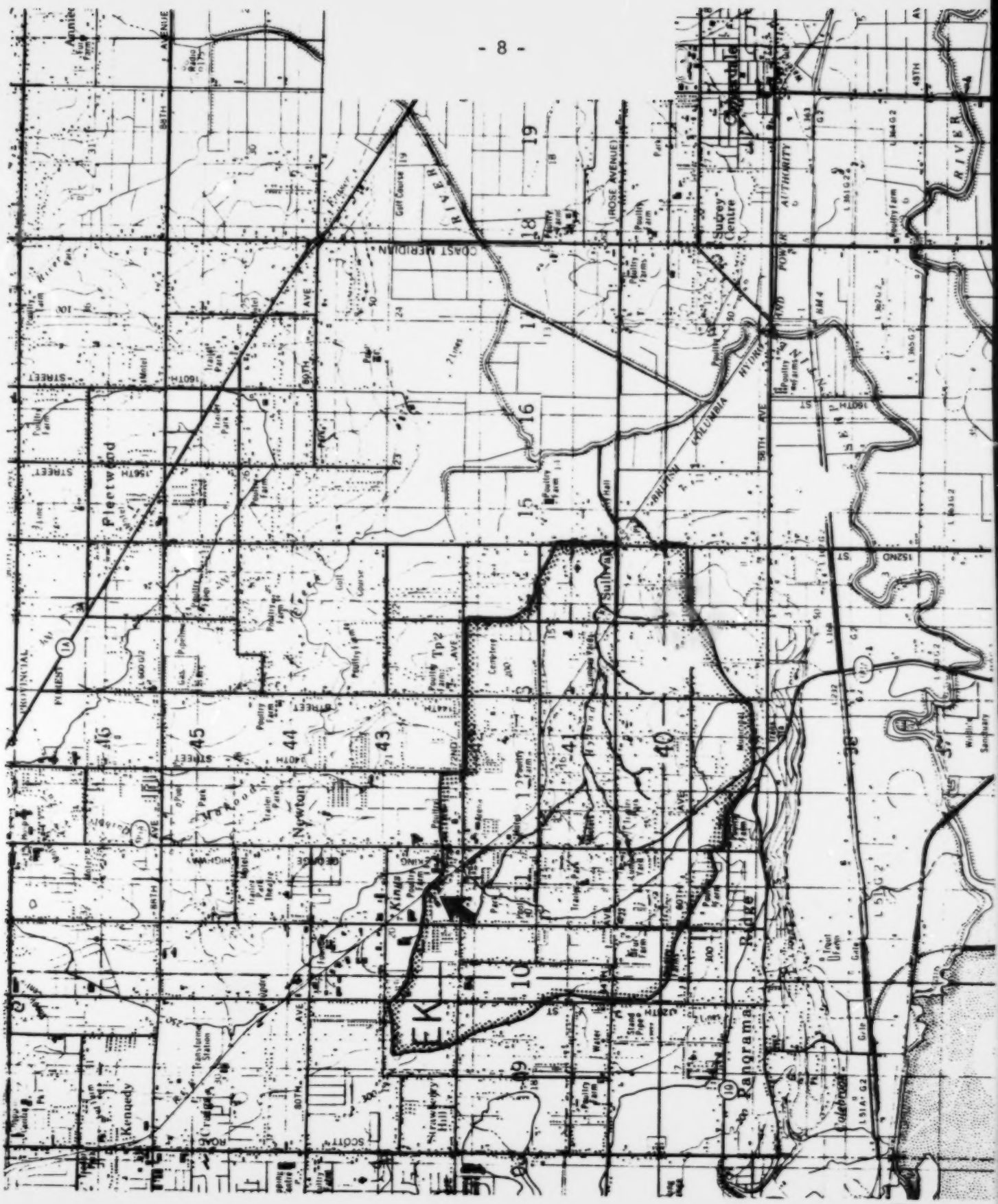
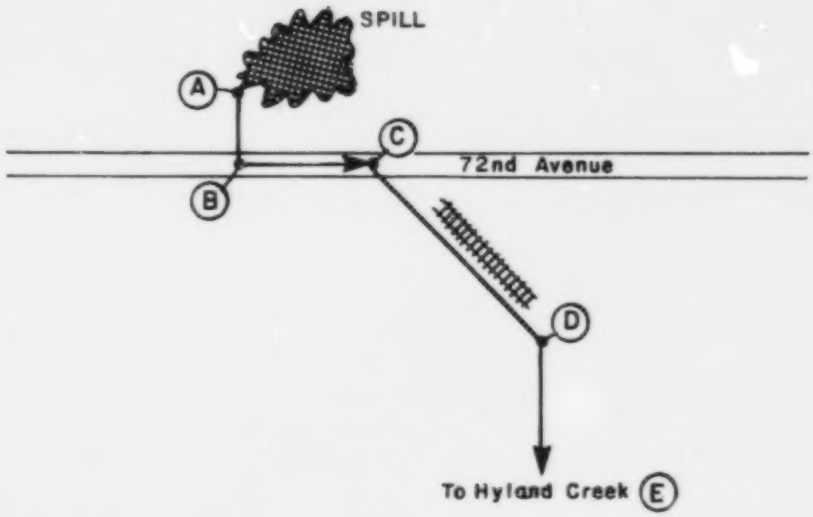


Figure 1a Hyland Creek Drainage

FIGURE 2

SPILL LOCATION: XYZ Chemicals
13375 Comber Way, Surrey

SPILL PATH:



SEGMENT	LENGTH (m)	PIPE DIAMETER (m)	SLOPE (%)	VELOCITY (m/s)	APPROX. FLOW TIME (min.)
AB	125	0.60	0.5	1.5	1.4
BC	200	0.675	1.0	2.4	1.4
CD*	375	--	2.0	-	25
DE	200	1.20	2.0	4.6	0.7

*Overland flow alongside railway tracks

ASSUMPTIONS:
1) Worst case condition; sewer therefore flowing full.
2) All sewers are concrete.
3) Ground surface alongside railway is lightly grassed.
4) SG assumed to be 1.0.

TABLE 2a SUMMARY BY PRODUCT OF HAZARDOUS COMMODITIES IN THE HYLAND CREEK WATERSHED

PRODUCT	LITRES	KG
Alcohols, n.o.s.	9 092	
Ammonia Hydroxide	614	
Calcium Hypochlorate	227	
Chloroethane	818	
Ethylene glycol	22 730	
Formaldehyde	409	
Hydrochloric acid solution	818	
Mineral spirits	41 118	
Naptha	40 914	
Nitric acid		600
Paints	23 139	
Phenol	455	
Phosphoric acid	68	
Resin solution	4 546	
Sodium Hydroxide	409	
Sodium Hypochlorite	45 460	
Sodium Nitrate		200
Wood Preservative	205	
Xylene	31 822	
Zinc nitrate		200

TABLE 2b SUMMARY OF HAZARDOUS COMMODITIES IN HYLAND CREEK WATERSHED BY CLASSIFICATION

CLASS	LITRES	KG
1	--	--
2	1 432	
3	196 705	
4	--	--
5	227	400
6	--	--
7	--	--
8	46 687	600
9	523	

restricted here, however, and there are no means readily available to contain, isolate, or divert the flow. Further, the time available for response is insufficient under worst case conditions. If the spill occurred during a period of lower flow and the company had a contingency plan the reduction of creek contamination might be possible.

The Tilbury Island Industrial Park is located in North Delta along the south arm of the Fraser River (Figure 3 and 3a). The only access is River Road with Tilbury Island directly to the north and the industrial site immediately to the south. Land use on Tilbury Island is approximatley 60% industrial and 40% agricultural. The park site is reserved entirely for industry.

The surficial geology of the area consists of silty to silt clay loam normally less than two metres thick overlaying at least 15 metres of interbedded fine to medium sand and minor silt beds. The soil is relatively permeable. All stormwater runoff drains into the Fraser River through a system of open drainage ditches.

The Tilbury Island Industrial Park area was selected for study because it is a relatively isolated industrial site. The drainage pattern is simple and well defined. The study also provided an opportunity to learn more about the materials being handled at this recently developed facility.

In the Tilbury Island Industrial Park scenario the spill occurs at XYZ Industries on Vantage Place. Five possible interception sites were identified along the drainage ditches between the plant and the river (Figure 4). The four culverts and one gate are all easily accessible. Flow velocities are very low providing considerable time for reaction. Adequate measures to prevent contamination of the sewer could be incorporated into company contingency plans quite easily.

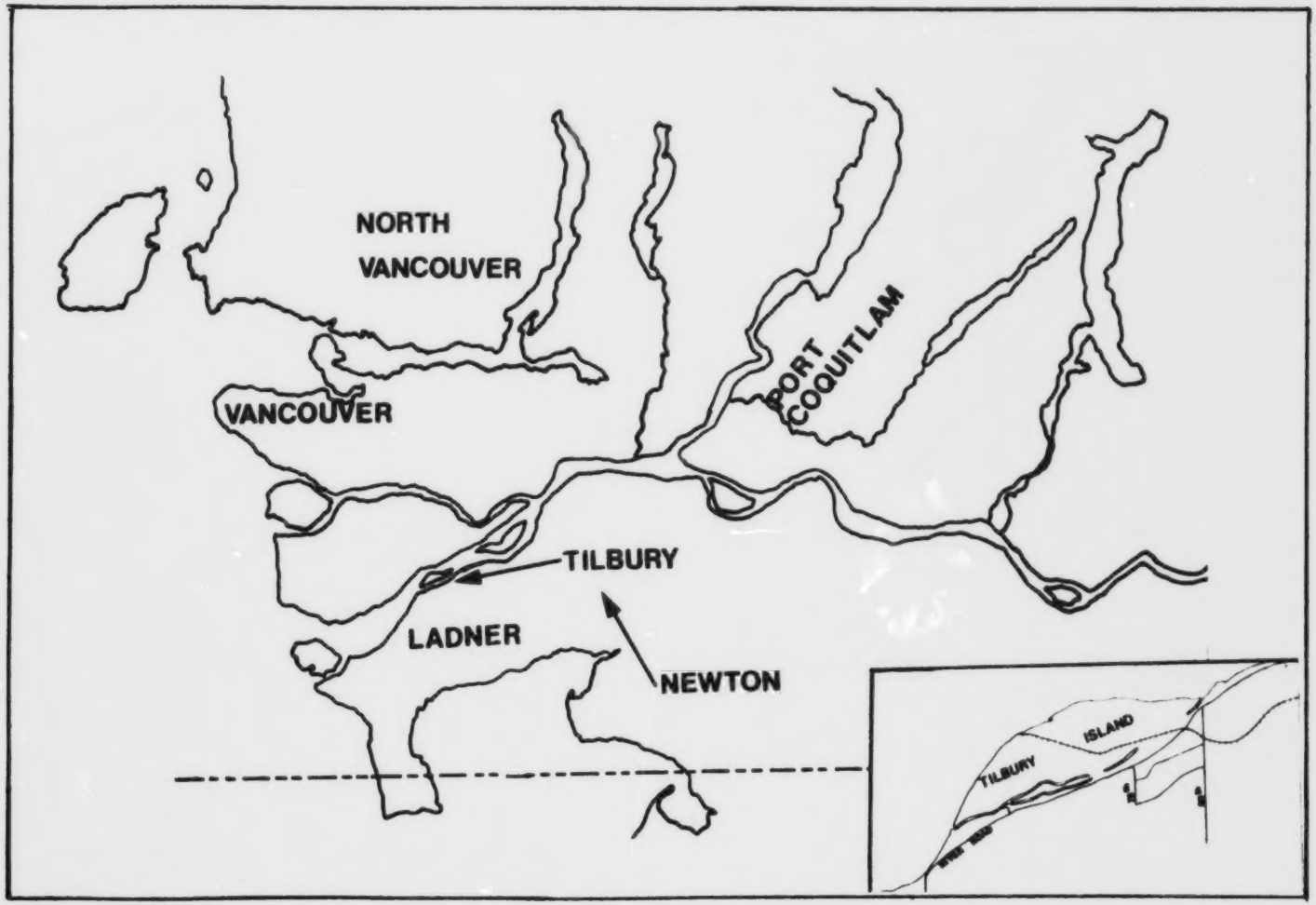


Figure 3 Tilbury Island Industrial Park

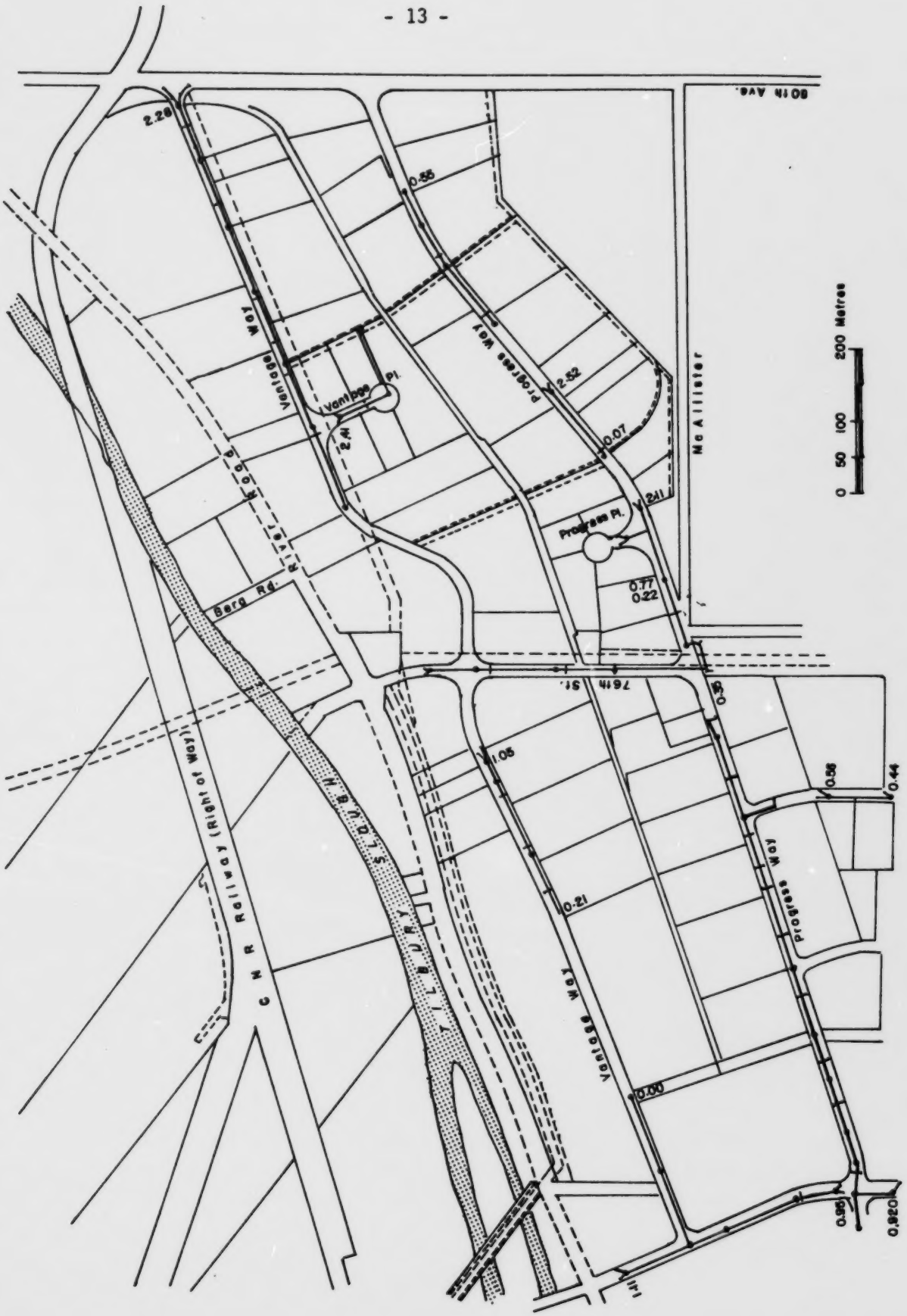


FIGURE 3a TILBURY INDUSTRIAL PARK DRAINAGE

SEGMENT	LENGTH (M)	% SLOPE	APPROX FLOW TIME (MIN)
AB	40	1.0	8
BC	110	.19	25
CD	455	.34	46
DE	400	.018	180
EF	4020	.02	1000

SPILL LOCATION

XYZ INDUSTRIES
7544 VANTAGE PLACE
DELTA, B.C.

SPILL PATH
EARTHEN DITCH

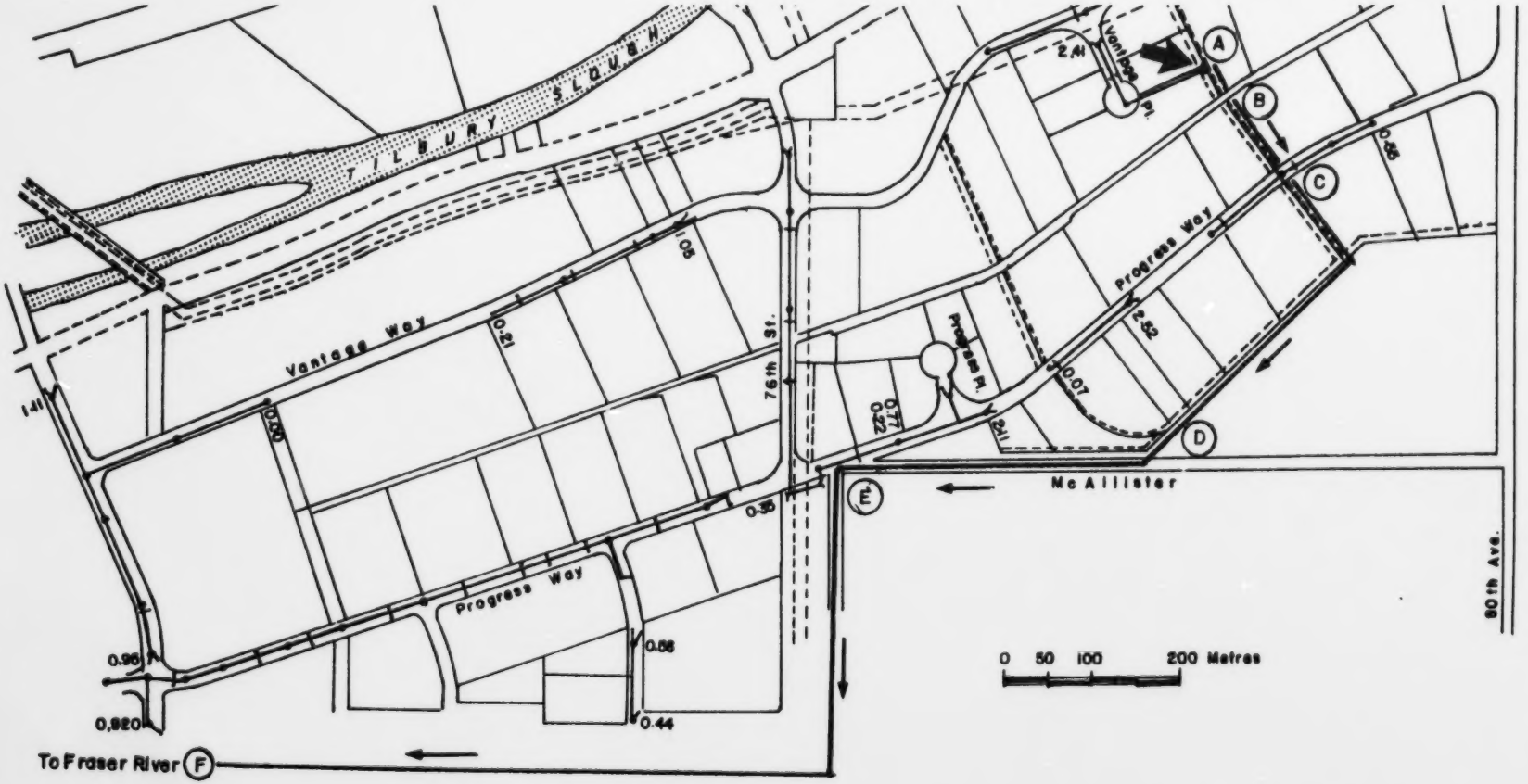


FIGURE 4: TILBURY SPILL SCENARIO

TABLE 3a SUMMARY BY PRODUCT OF HAZARDOUS COMMODITIES AT TILBURY ISLAND INDUSTRIAL PARK

PRODUCT	LITRES	KG
Acetone	409	
Alcohol	4 091	
Ammonia	205	
Butanol	205	
Chlorine	545	
Cresylic acid (creosote)		200
Dyes	2 050	
Ethanolamine		700
Ethylene glycol	3 069	
Hydrochloric acid	2 273	
Hydrofluoric acid		70
Inks		2 000
Isopropanol	409	
Isopropyl Acetate	2 046	
Isopropyl Alcohol		700
Mercuric compounds	205	
Lacquer	818	
Methanol	205	
Methylene chloride	4 750	
Naptha	2 705	15 000
Nitric acid	2 273	
Phosphoric acid	409	
Pine oil	2 046	100
Phenol		317 520
Potassium hydroxide	14 729	2 000
Resins	2 046	
Silver cyanide		50
Sodium hydroxide	20 457	650
Sodium nitrite		20
Sulphamic acid		30
Sulphuric acid	2 705	
Toluene	1 023	2 862 216
Trichloroethylene	205	
Xylene	818	

TABLE 3b SUMMARY OF HAZARDOUS COMMODITIES IN HYLAND CREEK WATERSHED BY CLASSIFICATION

CLASS	LITRES	KG
1	--	--
2	4 750	
3	20 912	2 880 016
4	--	--
5	545	420
6	2 455	317 870
7	--	--
8	27 685	3 440
9	409	--

5 DISCUSSION

It became evident during the surveys that some industry personnel have a limited perception of the hazardous nature of the products they handle. Company representatives often considered only the combustible materials to be hazardous, overlooking those with corrosive, toxic, or other dangerous properties. The surveys therefore produced substantial information for the data base but also increased industry awareness of potential hazards and environmental agency concerns.

The scenarios discussed in the report demonstrate some preliminary considerations for spill response. Contingency plans based on knowledge of local drainage and material types need not provide for every conceivable emergency. An acceptable level of initial response likely can be attained with available manpower equipped with suitable hand tools and materials. This is provided that there is early detection, rapid response, and good execution of planned procedures.

If lower mainland municipalities proceed with contingency planning for chemical spills then the Hazardous Goods Inventory is a logical first step to determine the level of risk in different areas. The standarized inventory data sheets are a useful means of selecting the necessary information. It is hoped that this study provides sufficient direction for planning groups within municipal agencies to proceed with contingency plan development for higher risk areas or specific industries in their communities.

APPENDIX A

Environment Canada

Transportation and Storage of Hazardous Commodities

Name of Company: _____

Location: _____

Phone No.: _____ Property Size: _____

Crossroads: _____

Grid No.: _____ Fire Dept. File No.: _____

Hazardous Commodity: _____

Other names/synonyms: _____

Substance or Article No.: _____ Class No.: _____

Colour Code: _____ Type of Storage: _____

Storage Capacity: _____ Quantity Stored: _____

Containment - Earthen Dykes, concrete dykes, none, other: _____

- Base type: impervious, non impervious _____

- Water draw off lines - over dyke, under dyke, valves: _____

- Water goes to: _____

Physical Integrity of Tanks: _____

Shipping Information:

(i) To facility:

Supplier: _____

Shipper: _____

Type of Container: _____ Quantity: _____

Type of Transport: _____ Frequency of Transport: _____

Principal Route Used: _____

(ii) from facility:

Shipper: _____

Type of Container: _____ Quantity: _____

Type of Transport: _____ Frequency of Transport: _____

Principal route used: _____

Wastes:

Generated Industrial Wastes:

	Liquids	Solids
Annual Volume:	_____	_____
Properties:	_____	_____
Disposal Method:	_____	_____
Disposal Company:	_____	_____

Liquid Effluent Discharge:

(i) to Sanitary Sewer, other than domestic wastes:

Annual Volume: _____

Properties: _____

Pre-treatment (if any): _____

(ii) to river or open ditch:

Annual Volume: _____

Properties: _____

Pre-treatment (if any): _____

Air Emissions from Industrial Processes: _____

Fuels Stored:

(i) Gasoline:

Storage Volume: _____

Tanks: above ground, underground, other: _____

Containment: dykes, fence, none, other: _____

Drainage: _____

(ii) Diesel:

Storage Volume: _____

Tanks: above ground, underground, other: _____

Containment: dykes, fence, none, other: _____

Drainage: _____

(iii) Other:

Storage Volume: _____

Tanks: above ground, underground, other: _____

Containment: dykes, fence, none, other: _____

Drainage: _____

Emergency Information:

Emergency Contacts:

(i) Name: _____

Address: _____

Phone: _____

(ii) Name: _____

Address: _____

Phone: _____

(iii) Name: _____

Address: _____

Phone: _____

Contingency Plan: _____

ACTION CODE
For fire or spillage control

Action				Comments on the action
1. Straight stream 2. Fog 3. Foam 4. Dry extinguishant				Fog — In the absence of fog equipment a fine spray may be used. Dry extinguishant — Water must not come in contact with the chemical involved.
P	V	Full	Dilute	V — Can be violently or explosively reactive. Full — Full protective clothing with BA. BA — Breathing apparatus and protective gloves. Dilute — May be washed to drains and sewers with large volumes of water. Contain — By any means available, prevent spillage from entering drains, sewers or water sources. Consider evacuation — This is the first priority in case of doubt. Evacuate immediate vicinity and request police assistance.
R				
S	V	BA		
T				
W	V	Full	Contain	
X				
Y	V	BA		
Z				
E	Consider evacuation			

Substance or article No: Action Code:

Hazard Page No:

Emergency Plan Reference:

Remarks:

Name of Company: _____

Hazardous Commodity: _____
Other names/synonyms: _____
Substance or Article No.: _____ Class No.: _____
Colour Code: _____ Type of Storage: _____
Storage Capacity: _____ Quantity Stored: _____
Containment - Earthen Dykes, concrete dykes, none, other: _____
- Base type: impervious, non impervious _____
- Water draw off lines - over dyke, under dyke, valves: _____
- Water goes to: _____
Physical Integrity of Tanks: _____

Shipping Information:
(i) To facility:
Supplier: _____
Shipper: _____
Type of Container: _____ Quantity: _____
Type of Transport: _____ Frequency of Transport: _____
Principal Route Used: _____
(ii) from facility:
Shipper: _____
Type of Container: _____ Quantity: _____
Type of Transport: _____ Frequency of Transport: _____
Principal Route used: _____

ACTION CODE
For fire or spillage control

Action	Comments on the action
1. Straight stream 2. Fog 3. Foam 4. Dry extinguishant	**Fog** — In the absence of fog equipment a fine spray may be used. **Dry extinguishant** — Water must not come in contact with the chemical involved.

P	V	Full	Dilute
R			
S	V	BA	
T			
W	V	Full	Contain
X			
Y	V	BA	
Z			
E	Consider evacuation		

V — Can be violently or explosively reactive.
Full — Full protective clothing with BA.
BA — Breathing apparatus and protective gloves.
Dilute — May be washed to drains and sewers with large volumes of water.
Contain — By any means available, prevent spillage from entering drains, sewers or water sources.

Consider evacuation — This is the first priority in case of doubt. Evacuate immediate vicinity and request police assistance.

Substance or article No: **Action Code:**

Hazard Page No:

Emergency Plan Reference:

Remarks: